Diffusing Education for Sustainability Into Teacher Education Programme in Nigeria: A Theory in Use

Olalekan Elijah Ojedokun
Institute of Education, Obafemi Awolowo University
Ile-Ife.220005, Osun State, Ile-Ife, Nigeria
Tel: 234-805-733-3448 E-mail: oojedok@yahoo.com

Received: February 24, 2012 Accepted: March 19, 2012 Published: April 15, 2012
doi:10.5430/wje.v2n2p109 URL: http://dx.doi.org/10.5430/wje.v2n2p109

Abstract

The benefits of integrated understanding of the issues, acquisition of the knowledge and the skills, understanding of the right perspectives, and development of appropriate values in respect of the intertwined actions and reactions of environment, economy and society make Education for Sustainability(EfS) an innovation that must be explored – more importantly for communication within the formal education sector, because such learning may be more sustainable than the one received through the informal system. This paper therefore explores an application of the "Diffusion of Innovation Theory" which identifies information, its communication, the social system and time as the four essential elements involved in the dissemination of information about an emerging problem; and in this context, an education that combines the study of development and environment as the innovation that should be communicated within the formal education sector, using the socially critical orientations and based on negotiations between the teacher and the recipients(learners). The paper thus reflects on the educational implications of the theory and suggests that curriculum of teacher education institutions must be reviewed to accommodate the learning content of EfS (e.g. climate change, green economy, democracy equity and social justice, structural change, reclamation of social bonds, waste disposal/management/recycling) and theorising more on learner -friendly approaches, so as to have a trickle down effects on the younger generation of school children who are the final recipients of environment and development-related education.

1. Introduction

Several global life threatening problems, especially the issues of global warming and climate change are increasing awareness and sensitivity to the need to take caution in the kind of activities that would be done on, and with the environment. Typical examples of such problems are the tsunami, earth quake, flooding, desertification, loss of biodiversity, etc; and since most of these problems are trans-boundary, they are generally viewed as problems of "one, and for all". This may explain why the whole world community seems to have a common voice on the urgency of the need to stem the tide of these problems, which are generally regarded as products of human beings' bad activities and lack of sufficient environmental and sustainability education on the part of the entire global community.

Given this attention, it is assumed that general assembly, long conversation and debate alone may not address the problems. But that a detailed discussion of environmental issues in the school may play a prominent role in providing appropriate environmental and sustainability education to the learners – with the believe that the youth which constitute about 18% of the world population, who apparently are the windows of hope of every nations are found in the school than any other sector of the society. However, the teacher who implements and enacts the curriculum is expected to be versatile in the knowledge of environmental sustainability and its pedagogy, so that he/she could impact adequate knowledge in the learners. It is also pertinent to note that the school has a lot of subjects on its roll. Hence, it is important to consider the school subjects that could be saddled with the responsibility of environmental sustainability education. There are varying methods of teaching which may also create a dilemma of choice on the part of the teacher.

Similarly, having the right teachers to carry out these tasks requires adequate teacher education; and bearing in mind that environmental sustainability concepts are now included in the Nigerian primary and secondary education curriculum, there is an urgent need to train teachers to impart these urgent and important concepts in the learners. This thus calls for the diffusion of the learning content of environmental sustainability into the teacher education programme. However, how to go about this would require an appropriate framework which may be rooted in some theories of education. One

of the theories is the "Diffusion of Innovation Theory" (Rogers, 1983). An in-depth understanding of this theory and its application could therefore provide some clues on how teacher educators could raise a generation of environmental sustainability education teachers who will also in turn create trickle down impacts on the learners that they teach day-by-day.

2. Objectives of the Paper

The paper seeks to explain the "Diffusion of Innovation Theory" propounded by Rogers (1983) and explores the applicability of the theory towards the integration of Education for Sustainability (EfS) in curriculum and pedagogy of teacher education programmes in Nigeria.

3. The Diffusion of Innovation Theory

Rogers (1983) seems to have provided a good tool in explaining how EfS could be mainstreamed in any sector, be it formal or non-formal. In his diffusion of innovation theory, Rogers explains that four problems arise about the implementation of any emerging area. They are

- The understanding of the emerging area itself (as an innovation)
- How to disseminate information about the emerging concept (communication)
- In what environment will the information be communicated (social system)
- When will it be communicated (Timing)

According to Rogers, it is when these problems are predefined and answers to them are predetermined that an emerging area can be properly implemented.

Thus with Education for Sustainability being a new area, especially in the African context, there is a challenge of how to involve the formal education system, of which the University Teacher Education departments will need to play a leading role in mainstreaming its useful ideas and concepts. Rogers' opinion therefore creates a gap to be addressed in the intellectual discourse about EfS, (in authors' opinion) so that the real concept is fully understood; the procedure for its teaching is clearly spelt out; the avenue for its teaching well defined; and convenient moment that will facilitate its understanding is specifically identified. In fact, the opinion of the authors is that, while the readiness of the formal education system to tackle these itemised areas is not known, the EfS practitioners are duty-bound to make some guidelines available. Such guidelines will therefore hopefully guide every section of the formal education system that may want to advocate education for sustainability. By this, EfS will not just be addressed as a subject matter of ordinary public debate which any lay man can just handle; rather, its executors would need a tool kit to guide their activities.

From the foregoing, one may be tempted to say that the challenges of the implementation of education for sustainability in the formal education system starts from effective tackling of the fundamental issues raised by Rogers in his Diffusion of Innovation Theory .i.e. the innovation, its communication, the social avenue and timing. Each of these items deserves to be discussed before addressing how University's teacher education departments as agents of EfS get involved in its implementation.

4. Education for Sustainability as an Innovation

Educational for Sustainability (EfS) is an emerging field, which focuses on how to enhance quality of life and well-being for human kind. Its primary objective is to promote an achievement of satisfying lives for all, while staying within the bounds of nature (Chambers et al, 2000). Sterling(2008.pp.22-23),explains that EfS by characteristics is contextual, innovative and constructive, focused and infusive, holistic and human in scale, integrative, process-oriented and empowering, critical socially (and) in terms of ideological awareness, seeks balancing of correlated pairs, systemic and connective, ethically clarifying issues, purposive and inclusive and lifelong. According to Sterling, the purpose of EfS is to enable people to participate actively in effective decision making in respect of sustainable development at local, national and global levels. However, in order to understand the subject matter of EfS better, it could be examined as an embodiment of two key concepts – "Education" and "Sustainability". The preposition "of", conjoining education and sustainability also has its own contextual meaning.

4.1 What is Education?

The definition of education is not easy to come by. Hence, most definitions of education are either the descriptions of activities that may be called education or the believe of whoever is making any statement about education, either valid or invalid. The authors' opinion here relates to what an organisation called "Teacher's Mind" (2001: online) expresses in respect of the definition of education. According to Teacher's Mind,

> *There is a dangerous tendency to assume that when people use the same words, they perceive a situation in the same way. This is rarely the case. Once one gets beyond a dictionary definition—a meaning that is often of little*

practical value—the meaning we assign to a word is a belief, not an absolute fact.

Some Dictionary definitions could however be of practical value. For instance, The Free Dictionary (2009: Online) defines **education as** "any process, either formal or informal, that shapes the potential of a maturing organism". "The Free Dictionary", distinguishes between informal education and formal education. While the former is said to result from the constant effect of environment, and shapes values and habits, the latter "is a conscious effort by human society to impact the skills and modes of thought considered essential for social functioning". Wikipedia, the free Encyclopedia (2008), explains that "Education encompasses both the teaching and learning of knowledge, proper conduct, and technical competency ... (and) focuses on the cultivation of skills, trades or professions, as well as mental, moral and aesthetic development". Suffice to state that Dictionary explanations may also be of good value when seeking meaning for education. Nonetheless, the idea of Teacher's Mind above could still be a valid statement. It may however not be necessary to belabour oneself about what education means since what may be derived are individual interpretations.

Although in its broadest sense, education is normally thought to be about acquiring and being able to use knowledge, and developing skills and understanding (Bartlet et al,2001.p.3), it is also seen to mean a life-long process of learning, action, and reflection involving all citizens (Huckle & Sterling,2008.p. xiii). By and large, the opinion expressed by Peters (1966; 1967) quoted in Bartlet et al (2001.p.3) appears to capture the scenario that this study seeks to explain. The opinion is, "education involve(s) a linking of concepts to gain a wider understanding of the world". Thus, in the context of this essay and the education for sustainability practise, three concepts appear to own the scene – environment, society and economy; and it is about them that the "shout" of sustainability evolves.

Hence, while education is to be looked at from all these perspectives, one of the ideas put forth by "James Rhem and Associates"(2004) (provided by Arendt, No Date: Online) seems to have a very high bearing with education for sustainability; and it will be a convenient point to pause a bit in conceptualising education in relationship to sustainability. The idea is

> *Education is the point at which we decide whether we love the world enough to assume responsibility for it and by the same token to save it from that ruin, which, except for renewal, except for the coming of the new and the young, would be inevitable. An education, too, is where we decide whether we love our children enough not to expel them from our world and leave them to their own devices, nor to strike from their hands their choice of undertaking something new, something unforeseen by us, but to prepare them in advance for the task of renewing a common world (Arendt, No Date: Online).*

It is noteworthy that this definition agrees with the WCED (1987) definition of sustainable development which by implication suggests education as a tool for sustaining the ideals of the society. This also agrees with the National Policy of Education in Nigeria which accepts education as an instrument par excellence for national development.

4.2 What is Sustainability?

Just as Education, finding meaning for Sustainability is also not easy. In fact commentators in Sustainability (e.g. Porritt, 1996.p.xii; McKeown, 2002.p.7) agree that it is easy to describe what is unsustainable than to define what is sustainable. While Porritt sees the identification of un-sustainability of any system as rather unfortunately easy, McKeown seems to have lamented how curious it is easy to note what things are unsustainable in the society and yet being unable to have a clear vision of what a sustainable world should be. The UNESCO (1997.p.7) observes that "most people in the world today have an immediate and intuitive sense of the urgent need to build a sustainable future,(however) they may not be able to provide a precise definition of 'sustainable development' or 'sustainability'". McKeown (ibid) also agrees with the opinion of UNESCO here. According to McKeown, anyone can see and recount inefficient use of energy, lack of water conservation, increased pollution, abuses of human rights, overuse of personal transportation, consumerism, among others, as unsustainable practises; yet claiming to understand what sustainability means may be difficult to believe.

The Brundtland Commission (1987) identifies certain issues as unsustainable trends. A list of the items is provided by Jenneth Parker (2008.p.34) .These are:

- the erosion of natural resource base;
- the high levels of world poverty;
- the need to provide for the ever-increasing world population;
- lack of integration of environmental concerns into economic decisions; and
- lack of international cooperation on environment and development issues.

Maiteny and Parker (2002.p.14) give a practical scientific example of an unsustainable activity, by quoting Franklin D. Roosevelt (former American President) who opines that 'the nation that destroys its soil destroys itself'. According to Maiteny and Parker, losing the soil is losing sustainability. Other things itemised as unsustainable by these EfS commentators are lack of local livelihood, capitalistic global economy, lack of cultural diversity, and denial of personal and emotional well-being (ibid.p.14). Similarly, Maiteny and Wade (2003.p.19) remark that it is unsustainable to believe that ecological systems depend on the economy; whereas there should be a mutual interdependence between both.

In economic terms, un-sustainability has been "linked with organised capitalism, which is based on mass production and consumption, a routine and highly organised labour process (labelled Fordism after Henry Ford) and social democratic models of regulation". This is said to have "brought much socio-economic progress, but eventually came up against the ecological, economic, political and social limits to growth" (Huckle, 2008.p.7). This idea seems to relate to that of Sterling (2008.p.25) on the difference between global societal and environmental "breakthrough" and "breakdown". To Sterling, the unsustainable practices of doing more of the same, results into dysfunctional and dystopian breakdown of the society. Sterling's opinion also accords with what may be linked to the likely cause of unsustainable future, discussed by Maiteny and Parker (2002.pp.61-62). To Maiteny and Parker, "living according to a world-view that assumes an infinite capacity to provide resources and absorb impacts on the part of ecological processes and human beings" is too economistic and can result in ecological, social and personal breakdown in the society.

Thus, going by these few examples, it is obvious that there is much to say about un-sustainability. Nonetheless, although sustainability is about making links in our complex world, and there are no easy answers (Parker, 2008.p.6), that does not say that there are no good and relevant opinions about sustainability. Sterling's (2008.p.24) opinion will be good to whet the appetite on this. According to him, traditional assumptions and expectations are crumbling; the world system is characterised by uncertainty, insecurity and unpredictability; there are global problems associated with post-modernism; and only attention at sustainability can address the challenge of urgency and also provide necessary direction for a far reaching change.

In her own perspective, Jenneth Parker (2008.p.36) explains that sustainability can be seen as a concept, a problematic, and a research or as a mission. According to her, sustainability describes the "desired aim of living in worthwhile ways ... overtime", if it is seen as a "concept". If a broad set up of problems about getting certain key relationships into a better working order is desired, it could be seen as a "problematic". If diverse and complex research programmes about the working relationships of certain key systems are desired, it may be seen as a "research"; and if seen as a call to engage in spiritual and/or more holistic, caring and integrative views and practices, it may be seen as a mission embarked upon. It thus suffices to state (in authors' own opinion) that every approach to sustainability either by definition, description or any other engagement may fall into each of these conceptions.

Maiteny and Parker (2002.p.27) examine the science for sustainability. They refer to Glasbergen and Bowers (1995) who define sustainability as 'a scientific principle, indicating the notion of natural systems enduring overtime'. The summary of their discussion is that sustainability seeks to observe, describe and understand how bio-ecological processes function and support lives and human well-being. According to them, sustainability requires an interpretation of what is observed; and that the interpretation is a cultural activity. The ecological perspectives provided by these sustainability commentators recount the works of Helton (1992.pp.2-4) and Posey (1999.p.xvii) which look around energy, cycles, diversity, community, interrelationships, change, and adaptation. The overall message conveyed by Maiteny and Parker is that there is a mutual interrelationship among all living organisms; and there are cycles that support life which must not at any time break. Should it happen, that is the beginning of un-sustainability!

Wade (2008.p.24), remarks that living sustainably is a question of value that is shared at an affected level. According to Wade, social changes that will be sustainable will require a change in human relationship with others (including nature) and people's way of being. Such changes will however be deliberate and intentional i.e. change does not occur without anyone willing it to happen (Binney & Williams, 1997.p.158).While commenting on how to situate education for sustainability, Parker (2008.p36), explains that "sustainability can be seen as an ethical and political programme that states that human production, consumption and settlement should respect the real limits of global life-support systems and the principles of social justice". While Parker asserts that the maintenance of healthy living systems is a key concern of sustainability (p.3), she also draws some ideas from other authorities (Braidorri et al,1994; Mellor,1997; and Cuomo1998) who remark that human life depends on the life-supporting systems of the planet; and thus, sustainability will require positive ethic that can unite care and concern for the environment with care for human beings; and that "the clause about their causes, on a global scale is essential"(p.36).

Moreover, an organisation called "Biothinking International"(reported in Chambers et al,2000.p.3) attempts a hint of what sustainability may imply, by providing a paradigm similar to the "three-Rs" of Education (Reading, wRriting and aRithmetic), in what it refers to as the "'Six Ss' to save the World". This paradigm is paraphrased as follows:

- Scale the economy within the capacity of the biosphere
- Use the Solar power to propel human processes
- Re(S) cycle wastes and reduce pollution
- Share resources equitably – do not hoard
- Provide environment that is Safe for all living organisms
- Have (safe) Sex (to keep living on)

From the little examples provided above, sustainability can be seen to have become a subject of debate, as people tend to define it in the ways that suit particular applications and purposes. Notwithstanding , the word, sustainability, came into limelight following the Brundtland Commission report (Brundtland, 1987: 43) which sees it as "Sustainable Development" – a "development that meets the needs of the present, without compromising the ability of future generations to meet their own needs" (Konsa,2004.p.20). Therefore, since the Brundtland, the word "sustainable" has been a prefix to every other word in daily businesses – sustainable economy, sustainable politics, sustainable education etc.

Sustainable development (preferred to be called sustainability in this paper) has an education component, which forms part of the Agenda for the 21st century (Agenda 21) according to the United Nations Conference on Environment and Development – UNCED (1992); and this thus brings about the idea of Education for Sustainable Development which is an integral part of the "comprehensive blueprint for the actions needed by societies at all levels, to realise the transition to sustainable development" (Huckle, 2008.p.13). By and large, sustainability has been taken as a synonym for "sustainable development". Although it may seem a play of semantics, EfS/ESD commentators have expressed preferences. While some prefer sustainability, some prefer sustainable development. The one that has however gained prominence is sustainable development : because it suits the purposes of power brokers in the mainstream of governance and economy, such as the IMF, World Bank, UNESCO and governments of developed countries. This may also explain why the UK government and other developed countries prefer the word "Education for Sustainable Development" when education is needed as an instrument to address sustainable development(as put by Huckle above).This could be apparent(in authors 'opinion) because developed countries may have some indexes of development to point to. Among such are, advanced technology and its attendant good infrastructure (e. g efficient road, rail, water and air travel network and the presence of towers of buildings), good condition of living for the citizens, qualitative education, good health insurance and medical services, low level of material poverty, low level of unemployment, true national independence, equipped security system etc(Allen & Thomas,1992.p.34) but the so-called developing countries, which may labelled as "evolving countries" may not have much to wish to sustain – yet they subscribe to Agenda 21!

This surprise is informed by the fact that development is a "buzzword (toxic word)" (Rist, 2007.p.485). It is because, it evolved as a word and a pursuit-in-practise following the emergence of the United States of America as a world power after the Second World War and the declaration by the US President Truman that about 80% of the countries of the world are underdeveloped. It followed then that "colonial powers saw themselves as participating in an economic race, with overseas territories as sources of raw materials." (Sachs, 1992.p.5). Hence, the race to have much of the same, through milking of other countries of their resources (natural and cheap human labour) has ended up impoverishing the masses, especially in countries which would have evolved naturally by themselves, had they not been tampered with by the so-called developed countries.

It is therefore not surprising today to note that where development can be seen and read, social bonds seem to have been swept away; human beings and social life such as marriage institution and kinsmanship have been commoditised; the bio-sphere has been put at a disequilibrium; overexploitation of forest, arable land, fish stock etc could be noticed (not only in the developed country, but also in other countries which serve as sources of raw food and material supplies);and above all, the number of poor people increases as people pay through their noses to enjoy the services that development brings(Rist,2007.p.485-491).

In a nutshell, according to Rist, "development entails lethal danger" (ibid); and in own word, does not worth being sustained, especially in evolving countries of the world. Hence, sustainability should not be viewed from the point of accumulation of growth in economy alone, but could be based on other alternatives that will seek to bind and rebuild a society and its shared values (as put by Wade (2008.p24) above); what will discommodity human beings; what will not damage ecosystem equilibrium; what will not overexploit resources; and lastly, what will not impoverish the masses. Suffice to say then, that any of the countries in the Southern Pole (evolving countries) that may wish to tread the path of the so-called "sustainable development" that developed countries advocate, is on an incongruous track(in author's opinion) .

Similarly, adopting the word sustainable development may not be congruous with the experiences of evolving

(developing) nations. This is because these nations do not seem to have a stable polity, neither do they seem to have sound economy; the education system seems bedevilled by a lot of uncertainties; poverty appears at the highest level and corruptions and crimes are on the increase day-by-day. Hence, the question is, what development do the poor country (especially those of the sub-Sahara Africa) want to sustain? ; and the global media (internet and satellite televisions) are not helping the matter – because they are based in and owned by the western states. As a result "they propagate a global consumer monoculture that generates waste, and perpetuates economic disparities (which are) environmentally disastrous" (Dixit, 1998.p.12). According to Dixit, it has caused replacement of rich cultural heritage with irrelevant and un-useful one, caused loss of genetic diversity, and widens the gap between the rich and the poor.

However, Nigeria, a typical example of developing country may only have indexes of sustainability to "pursue", which (in authors' opinion) could address exploiting/exploring the population size (150million) for economic purposes (by keeping them intact and catering for them); encouraging good agricultural practices of shifting cultivation(that can encourage reforestation and forestation and soil reclamation); promoting mix-cropping (that can improve soil fertility and check-mate pest infestations); preservation of local crops that are disease-resistant; conservation of rich-cultural heritage to preserve traditional histories, and application of vernacular/mother-tongue to enhance mastery of difficult school subjects (e.g. Mathematics and sciences); promotion of the rule of law and justice; promotion of brotherliness (unity in diversity), promotion of temperance and electoral/political tolerance, and promotion of research in clean technology to preserve the environment (to mention but few). Akpokavi (1992.p.29) seems to agree with this opinion. According to Akpokavi, to teach about "development" (sustainability) in the "South" (developing countries) is to teach about examining the history of the people, rediscovering the cultural heritage, celebrating good achievements, learning from mistakes, redefining development(so that it does not follow the western style of producing much of the same) and meeting local and global challenges assertively.

Therefore, the concept of sustainable development is rather too acclaimed than being "reclaimed" as claimed by western countries (Wade,2008.p.9) : because they have development to lay claim to and to sustain. Or may be sustainability to them may mean "caution", and better alternatives, which are congruous with sustainability. Evolving countries however, may be advised to adopt the word "sustainability", by exploring what is sustainable in their context and promoting it, "coveting" and "adapting" ideas that will enhance the quality of their environment and improve the well-being of their people, rather than following dogmatically the language – development, which is not available for them to sustain. The authors' opinion here has relevance to that of Wignaraja (1993.p.9). According to Wignaraja, Southern countries have to search alternatives for self-sustenance so that their economy can grow, welfare of citizens improved, and equity assured, as local resources and wisdom are applied creatively and wisely, and supplemented with (clean) imported capital and technology.

Sterling (2005.p.28) also agrees with all the above expressions, by providing insights into what the core values of sustainability should be. Sterling identifies them as "efficiency", "sufficiency", and "equity". While efficiency advocates doing more with less as a way of increasing capacity of the ecosystems, sufficiency advocates "resisting excessive consumption, having a sense of 'enoughness' and doing better at recognising and giving time to our non-material human needs such as love, security, respect, self-worth, community, green space..." etc. Equity however appears critical, but it advocates bridging the gap, between poor and rich people, between advanced and evolving countries and reconsideration of resource distribution patterns so that the unborn generation can equally have resources available enough for them to enjoy their own lives without stress (ibid). Therefore, if this message, about efficiency, sufficiency and equity is what advanced countries mean by "sustainable development" to which they subscribe (instead of "sustainability"), then they may be seen to have "reclaimed" the subject-matter of sustainability very well. But if otherwise, some disbeliefs may be generated.

However, the fact still remains that if evolving nations follow the path that has led to the deficiencies that caused the outcry for sustainability, then a greater danger awaits humanity on a global scale. None-the-less, societies have to move forward in its social and spatial outlook, and will still need to tap resources from the environment and meet the economic challenges of sufficiency and efficiency, in a gradual and incremental way without compromising the carrying capacity of the environment and fundamental rights of all living organisms including human beings, in such endeavours (Parker, 20081.p.75)

The conclusion that may be drawn in reference to Wignaraja here, and the contribution provided by Sterling, could therefore represent and interpret the concept, sustainability; and that, which Education for Sustainability as an innovation may need to advocate at any level, especially in the schools.

4.3 What is the "for" in "Education "for" Sustainability"?

From the analysis above, some light has been shed on the concept of education and sustainability. But before they are

hybrid together, the word, "for", amidst the two words "education" and "sustainability", to form education for sustainability (EfS), deserves to be explained. Pronounced "*\fər, (') fȯr, or (')fär\",* the Merriam-Webster Online Dictionary (2009) says it serves as a preposition and a conjunction between two words; and used as a function word to indicate purpose, intended goal, suitability or fitness. It is also taken as a word expressing reference to a phenomenon or giving reason i.e. "with respect to", or "because of", respectively. If applied to EfS, some clauses can evolve e.g. "education", for "the purpose of sustainability", "intended for sustainability", "suitable or fit for sustainability", "because of sustainability", or "with respect to sustainability." I will also like to add, "Education in favour of sustainability". My added opinion is informed by the fact that three types of approaches are educating in favour of sustainability. The opinion is also informed by how Lucas (1991: mentioned in Sterling (2008.p.28)) describes forms of environmental education. These are 'education 'in', 'about', and 'for' the environment. Thus, since environmental education is a contributory approach to education for sustainability (Sterling, 2008.p.34), the approaches may be reframed as education in sustainability, education about sustainability and education for sustainability respectively.

However, education in sustainability creates awareness, while education about sustainability encourages environmental management and control. But they are regarded by Sterling as weak approaches to EfS, because they do not promote critical reflection and are considered too technocratic, placing emphasis on nature alone. But to educate "for" sustainability, is to integrate issues pertaining to the environment with those associated with democracy, social justice, equity, structural change, and reclamation of social bonds cum propagation of green economy, with a mind to promoting reciprocative approaches to thinking about and solving local and global problems (ibid.pp.28-31)

4.4 What is Education for Sustainability?

If the two concepts, education and sustainability are properly placed in the functional context of the preposition "for", as explained above, the word, "Education for Sustainability" (henceforth referred to as "EfS"), could therefore evolve. EfS may then be defined (in authors' own words and reflection on the opinions of Peters(1966;1967), Bartlet et al,(2001.p.3),and Huckle and Sterling(2008.p. xiii)) as a life-long process of learning, action, and reflection on issues connected with the interwoven reactions of environment, society and economy. It(EfS) aims at involving all citizens in critical reflection on issues capable of affecting life and its supporting elements e.g. reasonable use of resources from the environment, stable society, polity and economy, social justice and equity(as discussed above). It is therefore expected to be such an education that makes acquisition and use of knowledge and development of skills and understanding of such issues easily possible. The interwoven reactions mentioned here reflect Chambers and colleagues' summary that sustainability has three components i.e. environment, society and economy, which relate to one another, to deliver quality of life. This is because achieving satisfying lives for all while staying within the bonds of nature is the primary objective of sustainability. A failure in this effort will never result in sustainability (Chambers et al, 2000.pp.1-14).

Hence, such education that emphasizes this message is an "education for sustainability"; and it can take place in any form – formal or non-formal/informal. The formal being a systematic instruction, teaching and training by professional teachers and consisting the application of pedagogy and the development of curricula i.e. in a formal school system; while informal education is a lifelong process of acquisition of attitudes, values, skills and knowledge from daily experiences through the influences of family and neighbours, work and play, the marketplace, the library, and the mass media (Corporation for Public Broadcasting, 2002; UNESCO, 2006; & tutor2u, 2008).

McKeown (2002) identifies five areas of reference when discussing education for sustainability. These are issues, knowledge, skills, perspectives and values. His ideas are in reference to the basic components of EfS as presented by Chambers et al (2000): which are environment, society, and economy which must be addressed together (McKeown used the word "combined"), because the environment, society and economy strike equilibrium in sustainability. According to McKeown, EfS seeks to provide answers to such questions as

- What are the most pressing environmental, societal, and economic issues facing the community?
- What basic environmental, societal, and economic knowledge are necessary to live sustainably in the community?
- What environmental, societal, and economic skills are necessary to live sustainably in the community?
- What environmental, societal, and economic perspectives are necessary to live sustainably in the community?
- What environmental, societal, and economic values are necessary to live sustainably in the community?

Without mincing words, the authors' opinion that education for sustainability should contain issues, perspectives, knowledge, values and skills related to efficiency, sufficiency and equity, which are as explained according to Sterling above are the core values of sustainability, and may therefore be regarded as indexes of sustainability. Thus, answers that are provided to McKeown's suggested questions above seem to be the likely components of EfS; and this makes the onus to lie on curriculum development experts, teachers and educational policy makers to address these fundamental

questions. The discussion of such matters should also take notice of the fact that matters of sustainability are given holistic approaches, if meaningful learning opportunities that will facilitate the understanding of education for sustainability will be provided for the formal school (Grunsell & Wade, 2000.p.20) and the informal learning systems too.

Thus (in authors' opinion), the benefits of integrated understanding of the issues, acquisition of the knowledge and the skills, understanding of the right perspectives, and development of appropriate values in respect of the intertwined actions and reactions of environment, economy and society make EfS an innovation that must be explored – more importantly for communication within the formal education sector, because such learning may be more sustainable than the one received through the informal system.

4.4.1 Communicating EfS

Effective communication may be regarded as the "soul" of Education for sustainability: whether it is delivered in the formal or informal setting; and it is expected to produce a behaviour change, as suggested by Parker (2008.p.81). According to Parker, unless EfS would amount to a failure, it must change peoples' behaviour. This assertion seems to agree with the opinion of Huckle (2006) that education is seen as an enabler of attitude and behaviour change which promotes healthy lifestyles or civic renewal. Therefore, the role of education seems commendable, provided the problems of issues, knowledge, value, skill and perspectives related to sustainability are well addressed in the learning process. Suffice to say that issues, knowledge, value, skill and perspectives are the parameters that will guide the discussion of any sustainability matter; and schools are duty bound to take notice of this and effectively communicate them in the classroom.

4.4.2 Methods/Strategies for Communicating EfS

The primary teaching method of EfS is that strategy which allows and seeks to promote cordial collaborative and critical examination of issues by the teacher and the learners. This strategy is rooted in the opinion of the Brazilian educational philosopher (Friere, 1996) who remarks that it is not proper to 'bank' knowledge in the learner; but that effective learning takes place when the learner and the teacher operate in a mutually democratic atmosphere of trust and share power and responsibilities.

Fien (1993) however harmonised different educational ideologies which provide somewhat good approaches towards communicating EfS. The ideologies are titled "major characteristics of vocational /neoclassical, liberal/progressive and socially critical orientations in education". According to Fien's socially critical orientation, the issue of teaching for behaviour change clearly manifests in the "desired learning outcomes": which seek to make a learner "a critical and constructive participant in society, who sees self-actualisation in a social context, who pursues the 'true and the good' in transforming and being transformed by society, not purely individualistically"

Further, the Fien's typology reflects that effective communication of EfS makes the teacher a project organiser and resource person who negotiates projects in a collaborative and critical manner. The student is seen a co-learner, who interacts with socially significant others to collaboratively execute social actions. In the same context, the teacher/student relationship is cordial; learners are involved in the mutual learning process; the teacher only needs to act as a coordinator; the mode of classroom control is democratic; the teacher and the learners share power and responsibilities; and the knowledge that is imparted is socially constructed. It also integrates mental and manual aspect of knowledge which is emancipatory; and employs the social constructivist interactionist theory which emphasizes that the learner constructs social reality and further reconstructs knowledge through historical and political processes.

Drawing inference from Fien's typology, it may be opined that the desired behavioural change expected after an EfS session would be a product of effective teacher/student relationship, where each also plays assigned role in a mutual interchange. This interchange is assumed to benefit both parties as co-learners.

4.4.3 The Social System for EfS

The third aspect of Rogers' assumption in the Diffusion of Innovation Theory, as may be applied to EfS has to deal with providing answers to the question, "in what environment will the (EfS) information be communicated?" i.e. social system. The answer to this is also not farfetched, if we have to go by the opinion of UNESCO (2006) that Education for Sustainability can be received in the classroom and among the neighbourhood of the family, work and play, the marketplace, the library, and the mass media. Hence, because of the interrelationship of the formal school and the society, the school is perceived as an agent that will help the society to overcome social inequities and prepare learners to participate in social, economic, political and environmental activities that will assist in social, moral and political conflict resolution. The school setting is expected to be heterogeneous and must have a close tie with the local community to facilitate free use of community resources for instructional purposes (Fien, 1993).

4.4.4 The Timing for EfS

When comparing the broad curriculum organisation of the vocational/neoclassical, the liberal/progressive and socially critical typologies of educational ideologies, Fien(1993) sees the vocational/neoclassical perspective as having a rigid subject framing and timetable which select students on the basis of performance criteria. The liberal/progressive is observed to have weak subject framing, and time tabling; and also selects students on the basis of interest and readiness; whereas, the socially critical typology does differentiation of learners and uses time based on negotiation between community, teachers and students. Going by this perspective of timing, EfS is deemed to be easily taught at a mutually agreed time between the teacher and the students. The socially critical typology appears to be more favoured as against the other two approaches which are rigid and weak respectively.

5. Implications of EfS for Teacher Education

For a successful mainstreaming of EfS as an innovation that may be communicated in the formal school system, (bearing in mind its issues, perspectives, values, knowledge and skills), institutions of teacher education may have to have some impacts. This is considered important because they have a way of influencing national curriculum in the course of theorising and expatiating on the curriculum content of primary/secondary schools and colleges which were formulated and designed by the Ministry of Education; and in an attempt to make their tuition fruitful, each individual is allowed the freedom to modify course curricula as understood in owns field of specialisation. Hence instructors and professors have the unrestricted opportunities to reorient their courses to include the study of any emerging theme (including sustainability) (UNESCO, 2005.p.70).

Thus, institutions/ departments of teacher education need to work hard by not only infusing EfS concepts into the initial teacher training programme, but should endeavour to acquaint pre-service teachers with the basic understanding of methods, strategies and techniques required to educate for sustainability, following the successful completion of their teacher education. Perhaps it should be mentioned here that it may be very difficult (or take extra efforts) for post-training teachers to understand the rudiments of EfS if they are not exposed to it in training. This is apparent because teachers in the (primary and secondary) school only need to implement the curriculum (teach); as it is not their responsibilities to design it: more importantly because they have too much jobs (teaching, assessment, report writing etc) to cope with (McKeown, 2002.p.35).

Hence, in order for teacher education departments to properly serve as advocates of EfS, answers have to be provided to questions such as, what should the content of EfS be? What method/strategies should be theorised about and expatiate upon? How could the EfS be introduced into the school subjects' curriculum? (to mention but few) It is believed that if the right answers are derived, they could adequately prepare well equipped pre-service teachers to become further advocates of the subject matter of EfS. It also believed that a reflective understanding and application of the issues discussed in the context of "Diffusion of Innovation Theory" could provide some insights into it.

6. Conclusion

This paper attempts to explain Education for Sustainability (EfS) as an innovation to which the youth must be exposed in order that they may play their roles not only as community educators, but also as members of the community who must also contribute to stem the tide of global environmental problems such as the tsunami, earth quake, flooding, desertification, loss of biodiversity, climate change, global warming etc. The paper suggests that the subject content of EfS needs proper understanding, taught with learner-centred methods/strategies, communicated at a mutually agreed time between the teacher and the learner and it must be in a formal education sector if the teaming population of the youth would benefit effectively about issues involved in the renewal of a common world; and the teacher education departments are expected to shoulder the responsibilities. It may therefore be recommended that colleges of education and departments of teacher education of universities should theorise more about EfS in content and pedagogy so that pre-service teachers are properly trained about it and thus become seasoned advocates of issues of sustainability after they had graduated from school.

References

Corporation For Public BroadcastingCorporation For Public Broadcasting Akpokavi, B. (1997) Development education from the southern perspective: In my view. The Development Education Journal, 6. Development Education Association, p.29.

Arendt, H. (ND). Teaching as leading .In "James Rhem & Associates" (2004) Quotations on Teaching, Learning, and Education. Available from http://iac.snow.edu/Tango/Tango.acgi$/quote?function=form

Bartlet et al. (2001). Introduction to education studies. London. Paul Chapman.p.3.

Brundtland Commission (1987). Our Common Future. Oxford. Oxford University Press.

Chambers, N. et al. (2000) Redefining progress. In Chambers, N. Et al. Sharing nature's interest. London: Earthscan. Pp.1-14.

Corporation for Public Broadcasting (2002). Formal vs. Informal Education. Available from: http://enhancinged.wgbh.org/started/what/formal.html [Accessed 24 October2008]

Dixit, K. (1998). Knowledge is a double edge sword in information, knowledge and development (Debate and Development Papers) London: Panos.p.12.

Fien (1993). Major characteristics of vocational /neoclassical, liberal/progressive and socially critical orientations in education". In Parker, J. (2008) Unit 1 Reader – Introduction to Education for Sustainability. London: Distance Learning Centre, London South Bank University. Reading 6.

Friere, P. (1972). Pedagogy of the oppressed. London: Penguin

Glasbergen, P. and Blowers, A. (1995). Environmental policy in an international context: perspectives on environmental problems. London: Arnold/The Open University of the Netherlands.

Grunsell, A. and Wade, R. (2000). Processes and management of change – with focus on the formal sector. London: Distance Learning Centre, London South Bank University. p.20.

Helton, D. (1992). Prisoners of the sun. London: BBC Education.

Huckle, J. and Sterling, S. (2008). Education for Sustainability. London: earthscan. P.115.

Huckle, J. and Sterling, S. (2008) Education for Sustainability. London: earthscan. p. xiii.

Huckle, J. (2008) Realising Sustainability in changing times. In Huckle, J. and Sterling, S.

(2008) Education for Sustainability. London: earthscan. p.7.

Konsa, K. (2004). Holistic approach to cultural heritage: Educational perspectives. International Journal of Teacher Education. Volume 4.p.20.

Lucas, A. (1991). Environmental Education: What is it, For Whom, For What Purpose, and How? In Huckle, J. and Sterling, S. eds. (2008). Education for Sustainability. London: earthscan.p.28.

Maiteny, P. & Wade, R. (2003). Theories and Perspectives on Environment and development. London: Distance Learning Centre, London South Bank University. p.19.

Maiteny, P. & Parker, J. (2002). Unit 6 Study Guide - Science and Culture in Education for Sustainability. London: Distance Learning Centre, London South Bank University.

McKeown, R. (2002). ESD Tool Kits Version 2.0 (Tools to orient education to address sustainability). Available from http://www.esdtoolkit.org/reorient_edu/basic_esd_wksht.htm[Accessed on 25 October 2008]. p.7.

Merriam-Webster Online Dictionary. (2009). "For". Merriam-Webster Online. Available on 12 August 2009 from http://www.merriam-webster.com/dictionary/for

Parker, J. (2008). Unit 1 Study Guide – Introduction to Education for Sustainability. London: Distance Learning Centre, London South Bank University.p.34.

Parker, J. (2008). 'Situating Education for Sustainability: a Framework Approach'. In Parker, J. &Wade, R. (eds) (2008) Journey Around Education for Sustainability. London: London South Bank University. p.6)

Porritt, J. (1996). Foreword. In Huckle, J. and Sterling, S. (2008) Education for Sustainability. London: earthscan. p.xii.

Rist, G. (2007). "Development as a Buzzword." Development in Practice 17, 485-91

Rogers, E. (1983). Diffusion of Innovations, 3rd ed. New York, NY: Free Press

Sachs,W. (1992). 'Development: a guide to ruin.In Unit 1 Reader:Introduction to Environment and Development Education,London:Distance Learning Centre,London South Bank University.p.5).

Sterling, S. (1992).Environmental Education and Environmental Policy. A good alliance. . In Huckle, J. and Sterling, S. (2008) Education for Sustainability, London: earthscan.

Sterling, S. (2008). Education in change. In Huckle, J. and Sterling, S. (2008) Education for Sustainability. London: earthscan. p.24. Ibid. p.25.

Sterling, S. (2005). Unit 7 Study Guide: Education for Sustainability. Education in Change. London: London South Bank University. p.1.

Thalwitz, W. P. (1990). Foreword. In Kreimer, A. & Munasinghe, M. Managing Natural Disasters and the Environment. Washington: Environmental Policy and Research Division. Environment Department, The World Bank. Pp. xii-xiv. The Free Dictionary (2009). Education. Available Online on Wednesday 5 August 2009 from http://encyclopedia2.thefreedictionary.com/education .

UNCED (1992). Promoting education public awareness and training. Chapter 36, Agenda 21. London: Regency Press.

UNESCO (1997). Education for a sustainable future. Paris: UNESCO. P.7.

UNESCO (2003). The Decade of Education for Sustainable Development: framework for a draft international implementation scheme, Paris, Unesco.p.27.

UNESCO (2003). United Nations Decade of Education for Sustainable Development (January 2005-December, 2014). Framework for a Draft International Implementation Scheme, July. Paris: UNESCO.

UNESCO (2006). Glossary. Retrieved from October 2008 http://portal.unesco.org/education/en/ev.University.

United Nations (2005). The United Nations Decade of Education for Sustainable Development. Japan: Nations Centre. p.130.

United Nations (2007). The world youth report. Retrieved on Wednesday 11 May 2011. from http://www.un.org/esa/socdev/unyin/documents/wyr07_statistical_annex.pdf

Wade, R. (2008). Journeys around education for sustainability. London: London South Bank University, Faculty of Arts and Human Sciences.p.24.

WCED (1987). Our common future. Oxford: Oxford University Press. p.43.

Wignaraja, P. (1993). Rethinking development and democracy. In Wignaraja, P. (ed). New social movements in the South. In Douglas, L. and Parker, J. (2000) Introduction to Environmental Education and Development. London: Distance Learning Centre, London South Bank University. p.55.